

GPS transfer of calibration at NIM (1102-2020)

Summary

In January-February 2020, the National Institute of Metrology (P.R. China, UTC acronym NIM) conducted a transfer of calibration from its G1-calibrated GPS receiver IM06 to the receiver IM21 which calibration was lost after an upgrade, and to a new receiver TF11.

The operations and report of measurements are described in the [report by NIM](#).

- **Final results for the calibrated systems**

The INTDLY values of the receivers given in Table 1 have been computed by NIM based on the results of the Group 1 trip [1001-2018](#) for IM06 and should not be updated to reflect later changes in the conventional INTDLY values of the reference receiver.

For a P3/PPP UTC link A-B involving any Group 1 and any receiver in this trip, the uncertainty resulting from the calibration, $U_B(A-B)$, is computed as

$$U_B(A-B) = (U_{CAL0}^2 + \Delta U_{CAL}(A)^2 + \Delta U_{CAL}(B)^2)^{1/2} \quad (1)$$

where $U_{CAL0} = 1.7$ ns is composed of the conventional Group 1 value (1.5 ns) and the uncertainty of the transfer (0.8 ns), and where ΔU_{CAL} (generally zero) is specified for each system. For UTC use, the ageing uncertainty will be based on the date of original calibration of IM06 i.e. 2018/08/15.

For single frequency C1 links, U_{CAL0} is 1.7 ns but could be complemented by an additional component to represent systematic errors in the ionospheric model.

Changes in the set-up of the receivers after the calibration must be accounted for as described in section A.3.6 of the most recent Calibration guidelines in <ftp://ftp2.bipm.org/pub/tai/publication/gnss-calibration/guidelines/>.

Table 1. Final P1/P2/C1 INTDLY values from the 1102-2020 exercise. Values of REFDLY with respect to UTC(NIM) and of CABDLY during the calibration are also indicated for reference. All values are in ns. “Meas. Date” refers to the first day of the differential calibration, to which the calibration results can be applied. “Impl. Date” is the MJD when the results should be implemented in the receiver.

System	BIPM	Meas. date	INTDLY P1	INTDLY P2	INTDLY C1	REFDLY	CABDLY	Note	ΔU_{CAL}	Impl. date
IM21	IM21	2020/02/17	-38.8	-43.6	-37.9	119.8	212.3		0.0	59001
TF11	IM31	2020/02/17	-28.3	-40.1	-27.1	130.8	215.0		0.0	59001

Notes:

(1).

Version history

V1.0 2020/06/11: Publication of results from V2.8 of the NIM report on the transfer of calibration, to be implemented in the receivers: